Association for Information Systems
AIS Electronic Library (AISeL)

AMCIS 2009 Proceedings

Americas Conference on Information Systems (AMCIS)

2009

Towards an Understanding of Knowledge Management Systems - UTAUT Revisited

Bourdon Isabelle
University of Montpellier, isabelle.bourdon@polytech.uni-montp2.fr

Ollet-Haudebert Sandrine
University of Paris Est, hollet@univ-paris12.fr

Towards An Understanding of Knowledge Management Systems – UTAUT Revisited

Bourdon Isabelle
University of Montpellier 2
isabelle.bourdon@polytech.univ-montp2.fr

Hollet-Haudebert Sandrine
University of Paris Est
INSEEC Business School
hollet@univ-paris12.fr

Abstract

User acceptance is one of the key fundamentals for the development of knowledge management systems (KMS). We propose a model of the factors that influence the contribution to KMS repositories in organizations. We use both qualitative and quantitative methodologies to validate a revised unified theory of acceptance and use of technology (UTAUT). We describe a theoretical framework that incorporates the specific facilitating conditions for knowledge management to enhance our understanding of KMS in France. An on line survey conducted with 200 potential contributors showed that performance expectancy and social influence have a significant impact on intentions. Moreover, facilitating conditions such as organizing structure, available time, time allocated, and incentives directly influenced contribution to the KMS. We found no significant effect for socio-demographic variables.

Key words: KMS; UTAUT, contribution

INTRODUCTION

Knowledge management (KM) is a major issue for organizations (Alavi 2000; Davenport and Prusack 1997; Drucker 1993) that put in place knowledge management systems (KMS) to facilitate the creation, storage, dissemination and application of knowledge (Alavi and Leidner 2001). However, a number of KMS suffer from non or under use mainly because of a lack of contributions to the system (Grover and Davenport 2001; Knaw and Balasubramanian 2003; O'dell and Grayson 1998). That is why an understanding of the drivers for adoption of KMS is a priority in KM research (Alavi and Leidner 2001). So, our research question is: what are the factors that influence the acceptance of KMS for potential contributors? To answer this question we explore the principal theories of acceptance of IT by individuals, and then we propose and test a version of the UTAUT model adapted to the KMS context.

THEORETICAL AND CONCEPTUAL FRAMEWORK

We base our study on state of the art models of acceptance of IT and include some specifics relating to KMS with the help of an exploratory investigation.

Adapting UTAUT to KMS

The literature has mainly focused on the acceptance of IT, prerequisites for IT use and the realization of measurable benefits. Most theories of acceptance of IT are based on the theory of reasoned action (TRA) (Fishbein and Ajzen 1975), such as TAM (Davis 1989) or the revised model of 2000, TAM2, (Venkatesh and Davis 2000). UTAUT (Venkatesh, Morris, Davis and Davis 2003), which synthesizes the elements of eight different models of acceptance, describes four principle constructs of the intention to use and the usage of IT: performance expectancy (UTPE), effort expectancy (UTEE) social influences (UTSI) and facilitating conditions (UTFC). Since its publication in 2003, numerous researchers have tested and validated UTAUT in different technological contexts: tablet PCs (Anderson, Schwager and Kerns 2006), and on line stocking (Wang and Yang 2005) for example.

In order to apply UTAUT to specific IT applications, such as KMS, modifications and revisions were necessary. A preparatory, qualitative exploratory study at the quantitative phase of our research was also carried out in

order to validate and enrich the research model. It produced the results that we summarize here (Bourdon, Ravinari, Vitari and Moro 2007). The investigation consisted of thirteen individual semi structured interviews with workers responsible for KMS in twelve large businesses, aimed at gaining a better understanding of the perceptions of the workers interviewed regarding the factors that favor, and those that limit, willingness to contribute to the KM system. Regarding the approach to usage, the study shows that the main problem is the procedures involved in making a contribution. For the facilitating conditions, we identified five principal factors: (1) the culture of sharing (2) the organizational structure, (3) the time available and (4) time allocated, (5) the reward systems. The results of this exploratory study allow us to propose a model of UTAUT adapted to the KMS context.

UTAUT adapted for KMS: definition of the variables and research hypothesis

We focused our study on the patterns of use behavior specific to KMS, which are two-dimensional (Goodman and Darr 1998): the patterns of storage and diffusion of knowledge in KMS and the patterns of use of knowledge. We believe it is not possible to explain the different patterns of use of KMS with the help of a single conceptual model. We retain the notion of "voluntary individual contributions to KMS" (UC) as the only dependent variable in our model, in line with the results of the explanatory study.

Regarding the mediating variable, the intention to use IT is assumed to have a direct effect on its effective use and we measure *"the strength of the individual's intention to realize the given behavior"* p. 984 (Davis, Bagozzi and Warshaw 1989).

H1: There is a positive relationship between the intention to contribute and the contribution to KMS.

We develop below all of the determinants of the model.

In UTAUT, the performance expectancy is *"the degree to which an individual believes that using the systems will help him or her to attain gains in job performance"* p.447 (Venkatesh et al. 2003). This construct is rooted in the concepts of perceived utility, extrinsic motivation, the appropriateness of the task, the relative advantage and the measured effect.

H2: There is a positive relationship between the performance expectancy (UTPE) of the contribution to KMS and the intention/willingness to contribute (IC) to KMS.

Numerous theoretical and empirical justifications show that there can be many components to the concept of performance expectancy. In our model, we propose two dimensions of UTPE, in line with the results of the exploratory study: the individual and the organizational level. UTPE in our model measures the extent of the individual's beliefs regarding their capacity to improve their individual performance and that of the organization by the way they contribute to KMS.

H2a: There is a positive relationship between performance expectancy at an individual level and the contribution to KMS.

H2b: There is a positive relationship between performance expectancy at the organizational level and the contribution to KMS.

In UTAUT, effort expectancy is *"the degree of ease associated with the use of the system"* p.450 (Venkatesh and Davis 1996). This construct depends on the concepts of perceived ease of use and complexity. In the area of KMS, Goodman and Darr (1998) have already shown that the ease of creation, diffusion, recording, researching, and of updating of knowledge managed by the KMS, all influence use behaviour.

H3: There is a positive relationship between effort expectancy (UTEE) of contribution to KMS and the intention to contribute.

In UTAUT, social influence (UTSI) is *"the degree to which an individual perceives that important others believe he or she use the new system"* p.451 (Venkatesh et al. 2003). This construct refers to subjective concepts and norms of social factors and image. Although Venkatesh et al. (2003) show that social influences provide a weak explanation in UTAUT, we postulate a positive relationship.

H4: There is a positive relationship between social influence (UTSI) and the intention to contribute (IC) to KMS.

Taylor and Todd (1995) suggest a breaking down of the variable "social influence" according to the differences of opinion between reference groups and the user. We also suggest a breaking down of social influence. We propose to analyze the influence of superiors and top management; and of colleagues and subordinates.

H4a: There is a positive relationship between the influence of work colleagues and subordinates and the intention to contribute to KMS.

H4b: There is a positive relationship between the influence of superiors and top management and the contribution to KMS.

We also introduce subjective norms into our model. Ajzen (1991) affirms that subjective norms that reflect perceptions referring significantly to the desire of the individual to adopt, or not, an approach, according to the opinion of others, are indirect determinants of individual behaviours.

H4c: There is a positive relationship between subjective norms (SN) and the intention to contribute to KMS (IC).

In UTAUT, facilitating conditions correspond with *"the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system"* p.453 (Venkatesh et al. 2003). In the specific context of KMS numerous studies have shown that organizational factors such as environmental, cultural, structural and managerial characteristics are indispensable for understanding the adoption of KMS (Alavi and Leidner 2001; Grover and Davenport 2001; Rubenstein-Montano, Liebowitz, Buchwalter, Mccaw, Newman and Rebeck 2001). Thus, we propose that the facilitating conditions will affect the level of contribution to knowledge bases.

H5: There is a positive relationship between facilitating conditions (UTFC) and the level of contribution (UC) to KMS.

We have identified four significant factors that influence the contribution to KMS, from the results of the exploratory enquiry and the related literature that we have integrated into the UTAUT model: the culture of sharing, organizational structure, time available and time made available and systems of incentives and rewards. Goodman and Darr (1996; 1998) estimate that there are "*pro learning*" organizational cultures, characterized by low levels of competition between individuals, by a trust between *"strangers"* and by long-term objectives. Other works also support this link (Alavi, Kayworth and Leidner 2005; Gold, Malhotra and Segars 2001; Grover and Davenport 2001).

H5a: There is a positive relationship between the culture of sharing and contribution to KMS.

Organizations strongly oriented towards knowledge are more associated with the notion of network than of bureaucracy (Gold et al. 2001; Nonaka and Konno 1998; Teece 2001). We accept the positive relationship existing between organizational structure and knowledge sharing behaviours (Alavi and Leidner 2001; Ba, Stallaert and Whinston 2001; Orlikowski 2000).

H5b: There is a positive relationship between organizational structure oriented towards knowledge management and the level of contribution to KMS.

We consider that the perceived time available and made available by the organization is a facilitating factor in contributions towards KMS, in line with the results of the exploratory enquiry and the basic theories (Hall 2001; Hall and Graham 2004; O'dell and Grayson 1998).

H5c There is a positive relationship between the time available for contributing to KMS and the level of contribution.

H5d: There is a positive relationship between the time made available for contributing and the level of contribution to KMS.

Finally, we consider the existence of reward and incentive systems as a factor influencing the adoption of KMS (Alavi and Leidner 1999; Bounfour 2000; Hall 2001; Hall and Graham 2004).

H5e: There is a positive relationship between systems that incentivize contribution and the level of contribution to KMS.

Chen et al. (Chen, Czerwinski and Macredie 2000) present a synthesis of works relating to individual differences and the acceptance of IT. Venkatesh et al. (2003) show that gender, age and experience are important moderating variables.

H6: Socio demographic variables influence contribution to KMS.

We propose to study the effects of socio demographic variables such as age, gender, level of training, place in the hierarchy, time working in the business, time in the post and the post occupied.

The proposed research is presented below:

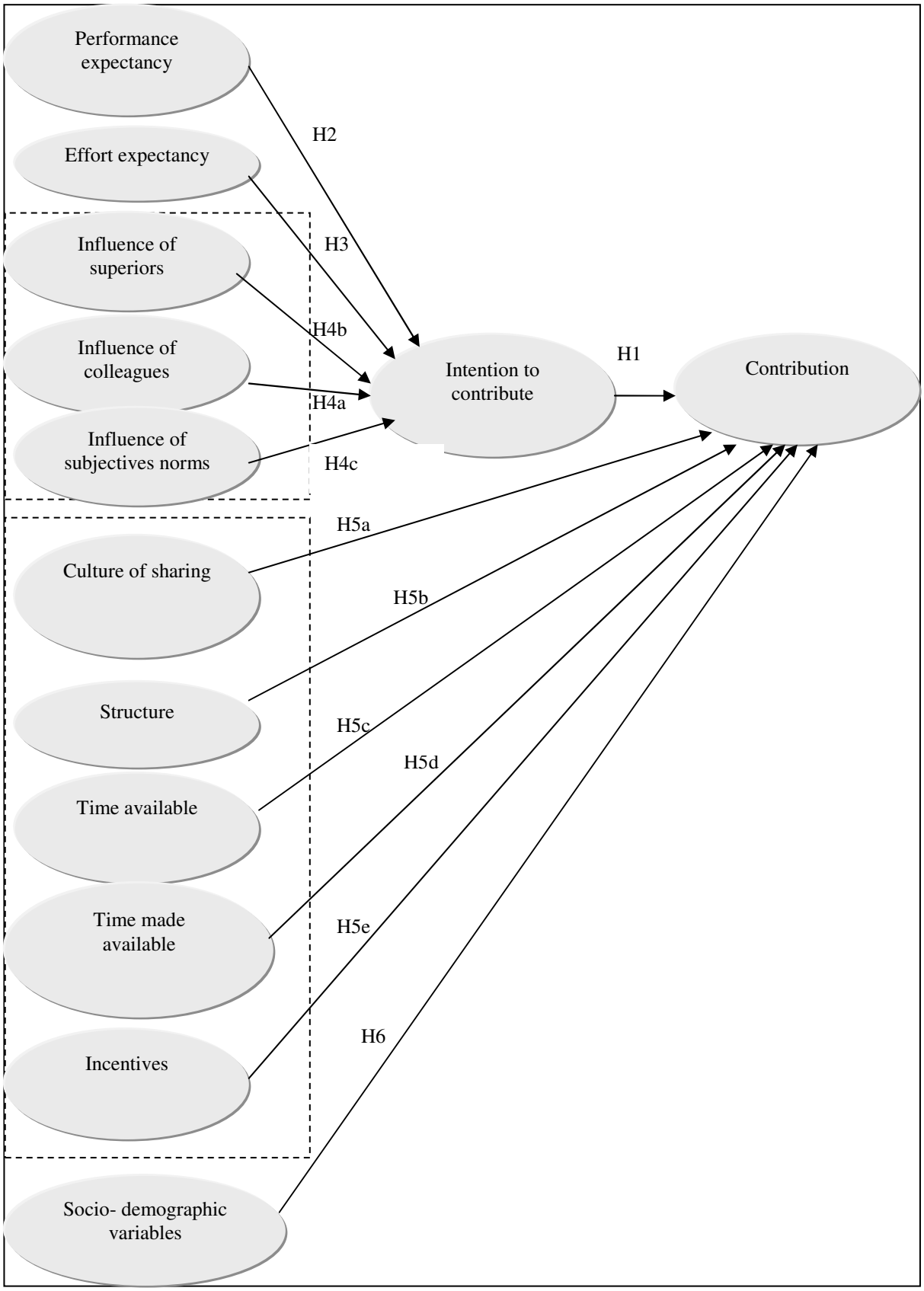

Figure 1: Proposed research model

RESEARCH METHODS AND RESULTS

In order to test the proposed research model we adopted a methodology of enquiry by questionnaire. We tested our research hypothesis with the help of the structural equation method.

Methodology

Here we present the measurement tools used as well as details of the research sample. The measure of individual contribution is made using a subjective scale of six items (Barillot 1998; Limayem, Bergeron and Richard 1997). UTPE of the contribution is measured by six items from Davis (1989) adapted to apply specifically to KMS. Regarding UTEE, we used four items adapted from Davis (1989) most frequently used in the calculation of this concept (Legris, Ingham and Collerette 2003). The items measuring social influences were adapted from (Taylor and Todd 1995). We divided the influence of management (superiors and higher management) and the influence of colleagues and subordinates.

Regarding facilitating conditions, the items measuring the culture of sharing were adapted from the works of Gold et al. (2001). The concept of organizational structure is measured with the help of ten items (Gold et al. 2001). We proposed three items relating to time made available and time available for contributing using Gross (2001). We adapted and generated a group of items from scales developed by Goodman and Darr (1998) and Gold et al. (2001) to measure incentive schemes.

The research was done in two French high technology and consulting businesses that had put in place KMS for their employees. These firms have corporate KMS with high formalization. The cultural context of both is favorable to KM and support by direction. There are structural and organizational facilitating conditions (dedicated roles and services, incentives process design for example). The questionnaire was administered on line to all potential contributors after sending an e-mail message presenting the study to 674 paid workers. 200 useable questionnaires were collected, a return of about 29.7%.

Analysis and results

Table 1 groups all of the variables tested in the model, averages, standard deviations and Cronbach's alpha. The convergent validity can be estimated by the t values associated with each item. We have deleted t values less than 1.96 and we present for each measured variable the minimum and maximum t values. The table also shows the correlations as well as the level of confidence associated with the correlation. All the variables in the model present a satisfactory differential validity. However, the relationship between time available and contribution shows a strong linkage. Even though the test of differential validity confirms that the two variables measured are indeed distinct, the association between the two concepts is very high (r=0.76).

To test the appropriateness of the elements to the theoretical model proposed, we use different indices considered to be less sensitive to the size of the sample such as TLI, PNFI, NFI, CFI or RMSEA. The first four indices indicate a better adjustment the closer they are to 1, while the acceptable threshold for RMSEA is generally from 0.05. Finally, the χ^2 an indicator that is very sensitive to the size of the sample will be used principally to compare alternative models. The processes were carried out with the help of AMOS® software Arbuckle (Arbuckle 1997) taking as the starting point the matrix of co-variances and using the method of maximum probability.

Variables	A	SD	α	t values	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Effort expectancy	12.45	2.64	0.80	4.49<t<8.0	-												
2. Perf. expectancy individual level	17.52	2.50	0.82	7.2<t<11.2	0.42 (0.03)	-											
3. Perf. expectancy organisational level	16.07	3.09	0.87	9.5<t<11.6	0.61 (0.03)	0.77 (0.03)	-										
4. Culture of sharing	20.08	5.22	0.85	6.7<t<8.0	0.13 (0.03)	0.17 (0.02)	0.12 (0.02)	-									
5. Influence of superiors/top management	18.78	4.30	0.82	7.3<t<12.2	0.35 (0.05)	0.53 (0.04)	0.34 (0.03)	0.38 (0.04)	-								
6. Influence of colleagues/ subordinates	13.04	2.93	0.78	7.5<t<7.5	0.38 (0.04)	0.36 (0.03)	0.44 (0.02)	0.23 (0.03)	0.71 (0.06)	-							
7. Organisational structure	15.41	3.81	0.82	6.8<t<10.3	0.18 (0.04)	0.16 (0.03)	0.05 (0.02)	0.81 (0.05)	0.31 (0.05)	0.20 (0.04)	-						
8. Incentives	13.43	3.55	0.79	7.2<t<8.9	0.31 (0.06)	0.27 (0.05)	0.14 (0.04)	0.09 (0.05)	0.27 (0.07)	0.29 (0.06)	0.27 (0.06)	-					
9. Subjective norms	6.09	1.77	0.74	10.3<t<10.3	0.35 (0.05)	0.40 (0.04)	0.36 (0.03)	0.38 (0.04)	0.84 (0.07)	0.84 (0.06)	0.31 (0.05)	0.41 (0.08)	-				
10. Time available	8.33	2.24	0.60	4.5<t<5.3	0.43 (0.02)	0.61 (0.01)	0.66 (0.01)	0.08 (0.01)	0.46 (0.02)	0.29 (0.01)	0.10 (0.01)	0.16 (0.02)	0.26 (0.02)	-			
11. Time allocated	9.90	2.06	0.65	5.2<t<7.8	0.31 (0.05)	0.33 (0.03)	0.16 (0.03)	0.04 (0.04)	0.61 (0.06)	0.35 (0.05)	0.41 (0.05)	0.30 (0.07)	0.38 (0.06)	0.38 (0.02)	-		
12. Intention to contribute (IC)	4.91	1.937	0.76	10.4<t<10.4	0.40 (0.05)	0.39 (0.04)	0.43 (0.04)	0.42 (0.05)	0.58 (0.07)	0.52 (0.06)	0.31 (0.06)	0.27 (0.08)	0.60 (0.07)	0.52 (0.03)	0.39 (0.06)	-	
13. Contribution to KMS	18.76	3.77	0.86	6.6<t< 8.5	0.28 (0.03)	0.61 (0.03)	0.57 (0.03)	0.21 (0.03)	0.45 (0.04)	0.31 (0.03)	0.20 (0.03)	0.14 (0.05)	0.23 (0.04)	0.96 (0.04)	0.42 (0.07)	0.73 (0.09)	-

Table 1: Averages, standard deviations (SD), reliability (α Cronbach), t values, correlations (Φ) and standard deviations (in parenthesis)

Results of the hypotheses: test of the model of structural equations

The model tested presents absolutely satisfactory qualities in terms of goodness of fit to theoretical data (CFI=0,93 ; TLI=0,92 ; NFI=0,90 ; RMSEA=0,09). The χ^2 by degree of freedom is equal to 2.70. The first result establishes the link between the intention to contribute and the contribution (r=0.51), in line with the initial model (Venkatesh et al. 2003).

In examining the blocks of determinants, the first concerns the links between improved performance and intention to contribute, a single hypothesis is validated: the more performance is perceived as having improved, the greater the intention to contribute. This result conforms with the UTAUT model (Venkatesh et al. 2003).

In line with Venkatesh et al. (2003), we found a direct connection between the effort required and the contribution, which suggests that a process of internalization is at work. The block concerning social influence (UTSI) is relatively in line with the theory, since the influence of superiors and subjective norms are positively correlated with intention to contribute. It is worth noting that the hypothesis relating to the influence of colleagues and intention to contribute can be validated if a threshold of 10% is used (r=0.14; t=1.70). These results are close to numerous validations in the area of IT usage (Compeau and Higgins 1995; Davis et al. 1989; Moore and Benbasat 1991; Taylor and Todd 1995) and the validations in the area of adoption of KMS (Davenport 1997; Fichman 2000; O'dell and Grayson 1998).

Regarding the results of the group of facilitating conditions, the culture of sharing was the only non-determining factor, which is contrary to other studies (Alavi et al. 2005; Delong and Fahey 2000; Goodman and Darr 1998; Hall 2001). This result seems surprising and could be the subject of further analysis, perhaps with other sample groups.

On the other hand, we notice that in our sample organizational structure positively affects contribution to KMS, which confirms previous results (Blackler 1995; Gold et al. 2001; O'dell and Grayson 1998).

The results relating to the two time elements are equally significant and corroborate previous works (Alavi and Leidner 2001; O'dell and Grayson 1998; Orlikowski 2000). Firstly, the time available to contribute seems to be more important to the adoption of a positive approach to contributing than time allocated (respectively r=0.55 and r=0.19). Secondly, the strength of association between the concept of time available and the notion of contribution itself needs more investigation. In effect, we can envisage that time could be a dimension of contribution because it seems to be an indispensable precondition to usage.

Another result deserves particular attention, which is the link between incentives and contribution to KMS. The theoretical hypothesis supports a relationship between the two variables, and yet our results show an inverse relationship, as was found by Bock et al. (Bock, Zmud, Kim and Lee 2005). According to Constant et al. (Constant, Kiesler and Sproull 1994), experienced individuals integrate the sharing of knowledge and can develop negative attitudes if they receive extrinsic rewards in return for the sharing behaviour that they see as their normal work activity.

Hypothesis	Links	T-Test Student	Decision
H1	Intention to contribute (IC) ➔ Contribution to KMS	0,51 (t=6,21)	*supported*
H2	Performance expectancy (UTPE) ➔ Intention to contribute (IC)		
H2a	Performance expectancy individual level➔ Intention to contribute	0,01 (t<1,96)	*not supported*
H2b	Performance expectancy organizational level➔ Intention to contribute	0,24 (2,92)	*supported*
H3	Effort expectancy ➔ Intention to contribute (IC)	0,11 (t<1,96)	*not supported*
H4	Social influences (UTSI) ➔ Intention to contribute (IC)		
H4a	Influence of colleagues and subordinates ➔ Intention to contribute (IC)	0,14 (t<1,96)	*not supported*
H4b	Influence of superiors and top management ➔ Intention to contribute (IC)	0,32 (t=3,62)	*supported*
H4c	Influence of subjective norms (SN) ➔ Intention to contribute (IC)	0,18 (t=2,33)	*supported*
H5	Facilitating conditions (UTFC) ➔ Contribution to KMS		
H5a	Culture of sharing ➔ Contribution to KMS	-0,05 (t<1,96)	*not supported*
H5b	Organizational structure ➔ Contribution to KMS	0,19 (t=3,04)	*supported*
H5c	Time available for the contribution ➔ Contribution to KMS	0,55 (t=4,18)	*supported*
H5d	Time allocated for the contribution ➔ Contribution to KMS	0,19 (t=2,73)	*supported*
H5e	Incentive schemes to encourage contribution ➔ Contribution to KMS	-0,21 (t=-3,27)	*supported*
H6	Socio-demographic characteristics ➔ Contribution to KMS	*not supported*	

Table 2: Test of hypotheses

So, no personal characteristic had an influence either on the level of intention to contribute or on the contribution level.

In fact, one can see that the portion of explained variance of the contribution variable in the model represents 68.5%. This demonstrates the relevance of the choice of determinant variables.

DISCUSSIONS, LIMITATIONS AND FUTURE RESEARCH

On the theoretical level, our results partially validate the UTAUT model and confirm notably the influence of context for adoption of KMS (Alavi and Leidner 2001; Grover and Davenport 2001; O'dell and Grayson 1998). On the methodological level we have transposed and validated the Anglo-Saxon measurement tools and generated specific measurement tools for the incentive and time variables. On the managerial level, we have identified practical tools for intervention that could be used to increase acceptance of KMS (Jasperson, Carter and Zmud 2005; Venkatesh and Bala 2008).

However, a number of limitations are attached to this work. The first relates to the size of our sample (N=200), which does not allow us to carry out the moderating analyses present in the initial model (Venkatesh et al. 2003). The second relates to usage of a self-assessment measure for the dependent variable. It would be useful in future research, in order to avoid bias, to couple this with objective measures and to discuss the time dimension of contribution behaviour. Finally, it would seem to be premature to make generalizations from this research, notably when account is taken of the sample collected in two organizations and the low number of empirical and theoretical studies regarding context based facilitating conditions, such as culture, incentives and reward systems. These limits allow us to envisage more directions for future research. First of all our study could be carried out in other businesses. In addition, our results suggest that some reflection on the measuring tools used would be useful. Finally, a longitudinal research study analysing KMS through the pre- and post implantations phases would be useful (Cooper and Zmud 1990; Jasperson et al. 2005; Venkatesh et al. 2003).

CONCLUSIONS

The first objective of this article was to better understand the adoption of KMS with the help of the application of a model, UTAUT, adapted to the specific context of KM. We have thus (1) validated the use of the UTAUT model in the specific context of KMS and (2) enriched and adapted the model by integrating five facilitating conditions peculiar to KMS. Using an empirical study, we validated a part of UTAUT, relating to intentions to contribute and to contributions to KMS: of the 13 hypotheses formulated, eight were supported in our sample.

REFERENCES

1. Ajzen, I. (1991) "The theory of planned behavior," *Organizational Behavior and Human Decision Processes*, 50, 179-211.

2. Alavi, M. (2000) "Managing organizational knowledge," in: *Framing the domains of it management research: Projecting the future from the past,* R. Zmud, W (ed.), Pinnaflex educational resources, Cincinnati.

3. Alavi, M., Kayworth, T.R., and Leidner, D.E. (2005) "An empirical examination of the influence of organizational culture on knowledge management practices," *Journal of Management Information Systems*, 22, 3, 191 - 224.

4. Alavi, M., and Leidner, D.E. (1999) "Knowledge management systems: Issues, challenges, and benefits," *Communications of the Association for Information systems*, 1, 7.

5. Alavi, M., and Leidner, D.E. (2001) "Review: Knowledge management and knowledge management systems: Conceptual foundations and research issues," *MIS Quarterly*, 25, 1, March, 107-136.

6. Anderson, J.E., Schwager, P.H., and Kerns, R.L. (2006) "The drivers for acceptance of tablet pcs by faculty in a college of business," *Journal of Information Systems Educa-tion*, 17, 4, 429-440.

7. Arbuckle, J.L. (ed.) (1997) *Amos user's guide version 3.6*. Small Walters Corpo-ration., Chicago

8. Ba, S., Stallaert, J., and Whinston, A.B. (2001) "Research commentary: Introducing a third dimension in information systems design - the case for incentive alignment," *Information Systems Research*, 12, 3, 225-239.

9. Barillot, P. (1998) "Facteurs explicatifs de l'utilisation de la messagerie électronique textuelle : Résultats d'une enquête réalisée au sein d'organisations municipales," *Strategic Information Management*, 3, 1, 41-68.

10. Blackler, F. (1995) "Knowledge, knowledge work and organizations: An overview and interpretation," *Organization Studies*, 16, 6.

11. Bock, G.-W., Zmud, R.W., Kim, Y.-G., and Lee, J.-N. (2005) "Behavioral intention formation in knowledge sharing : Examining the roles of extrinsic motivators, social-psychological forces, and organizational climate," *MIS Quarterly*, 29, 1, 87-111.

12. Bounfour, A. (2000) "Gestion de la connaissance et système d'incitation : Entre théorie du "Hau" Et théorie du "Ba," *Système d'information et management*, 5, 2, 7-40.

13. Bourdon, I., Ravinari, A., Vitari, C., and Moro, J. (2007) " Improving kms effectiveness : The role of organizational and individual's influence," *International Journal of knowledge management*, 3, 2.

14. Chen, C., Czerwinski, M., and Macredie, R. (2000) " Individual differences in virtual environments - introduction and overview," *Journal of the American Society for Information Science*, 51, 6.

15. Compeau, D., and Higgins, C.A. (1995) "Computer self-efficacy: Development of a measure and initial test," *MIS Quarterly*, 6, 2, June, 189-211.

16. Constant, D., Kiesler, S., and Sproull, L. (1994) "What's mine is ours, or is it? A study of attitudes about information sharing," *Information Systems Research*, 5, 4, december, 400-421.

17. Cooper, R.B., and Zmud, R.W. (1990) "Information technology implementation research: A technological diffusion approch," *Management Science*, 36, 2, 123-139.

18. Davenport, T., and Prusack, L. (eds.) (1997) *Working knowledge: How organizations manage what they know*. Harvard Business School, Boston.

19. Davenport, T.H. (1997) "Ten principles of knowledge management and four case studies," *Knowledge and Process management*, 4, 3.

20. Davis, D.F. (1989) "Perceived usefulness, perceived ease of use, and user acceptance of information technology," *Management Information Systems Quarterly (13:3), 1989, pp. 318-339.*

21. Davis, F.D., Bagozzi, R.P., and Warshaw, P.R. (1989) "User acceptance of computer technology: A comparison of two theorical models," *Management Science*, 35, 8.

22. DeLong, D.W., and Fahey, L. (2000) "Diagnosing cultural barriers to knowledge management," *Academy of management Executive*, 14, 4.

23. Drucker, P. (1993) *Post capitalist society*, (First ed.) Harper Business Press, New York, NY, 232.

24. Fichman, R.G. (2000) "The diffusion and assimilation of it innovations," in: *Framing the domain of it management,* E.Z. R.W. (ed.), Pinnaflex Educational Re-sources, Cincinnati, Ohio, 105-127.

25. Fishbein, M., and Ajzen, I. (1975) *Belief, attitude, intention and behavior. An introduction to theory and research* Addison-Wesley, MA.

26. Gold, A.H., Malhotra, A., and Segars, A.H. (2001) "Knowledge management: An organizational capabilities perspective," *Journal of Management Information Systems*, 18, 1, Summer, 185-214.

27. Goodman, P.S., and Darr, E.D. (1996) "Exchanging best practices through computer aided systems," *Academy of Management Executive*, 10, 2.

28. Goodman, P.S., and Darr, E.D. (1998) "Computer-aided systems and communities: Mechanisms for organizational learning in distributed environnements," *MIS Quarterly*, 22, 4, winter, 417- 441.

29. Gross, A.E. (2001) "Knowledge sharing: The crux of quality", Proceedings of the Annual Quality Congress, Charlotte, 452-457.

30. Grover, V., and Davenport, T.H. (2001) "General perspectives on knowledge management: Fostering a research agenda," *Journal of Management Information Systems*, 18, 1.

31. Hall, H. (2001) "Input-friendliness: Motivating knowledge sharing across intranets," *Journal of Information Science*, 27, 3, 139-146.

32. Hall, H., and Graham, D. (2004) "Creation and recreation: Motivating collaboration to generate knowledge capital in online communities," *International Journal of Information Management*, 24, 3, 2004/6, 235-246.

33. Jasperson, J.S., Carter, P.E., and Zmud, R.W. (2005) "A comprehensive conceptualization of post-adoptive behaviors associated with information technology enabled work systems.," *MIS Quarterly*, 29, 3, 525-557.

34. Knaw, M.M., and Balasubramanian, P. (2003) "Knowledgescope: Managing kowledge in context," *Decision Support Systems*, 35, 467-486.

35. Legris, P., Ingham, J., and Collerette, P. (2003) "Why people use information technology ? A critical review of the technology acceptance model," *Information & management*, 40, 191-204.

36. Limayem, M., Bergeron, F., and Richard, A. (1997) "Utilisation des messageries électroniques : Mesures objectives versus mesures subjectives," *Systèmes d'Information et Management*, 2, 1, 51-69.

37. Moore, G.C., and Benbasat, I. (1991) "Development of an instrument to measure the perceptions of adopting an information technology innovation," *Information Systems Research*, 2, 3, 192-222.

38. Nonaka, I., and Konno, N. (1998) "The concept of "Ba": Building a foundation for knowledge creation," *California Management Review*, 40, 3, 40-55.

39. O'Dell, C., and Grayson, C.J. (1998) "If only we knew what we know: Identification and transfer of internal best practices," *California Management Review*, 40, 3, spring, 154-174.

40. Orlikowski, W., J. (2000) "Using technology and constituting structures: A practice lens for studying technology in organizations," *Organization Science*, 11, 4, 404-428.

41. Rubenstein-Montano, B., Liebowitz, J., Buchwalter, J., McCaw, D., Newman, B., and Rebeck, K. (2001) "A systems thinking framework for knowledge management," *Decision Support Systems*, 31, 5-16.

42. Taylor, S., and Todd, P. (1995) "Understanding information technology usage: A test of competing models," *Information Systems Research*, 6, 2, June, 144-173.

43. Teece, D. (2001) "Strategies for managing knowledge assets: The role of firm structure and industrial context," in: *Managing industrial knowledge: Creation, transfer and utilization,,* I. Nonaka and D.J. Teece (eds.), Sage Publications, London, 145-169.

44. Venkatesh, V., and Bala, H. (2008) "Technology acceptance model 3 and a research agenda on interventions," *Decision Sciences*, 39, 2, 273-315.

45. Venkatesh, V., and Davis, F.D. (1996) "A model of the antecedents of perceived ease of use: Development and test," *Decision Sciences*, 27, 3, Summer, 451-481.

46. Venkatesh, V., and Davis, F.D. (2000) "A theoretical extension of the technology acceptance model: Four longitudinal fields studies," *Management Science*, 46, 2, February, 186-204.

47. Venkatesh, V., Morris, M.G., Davis, G.B., and Davis, F.D. (2003) "User acceptance of information technology: Toward a unified view.," *MIS Quarterly*, 27, 3, 2003/09, 425-478.

48. Wang, H.-I., and Yang, H.-L. (2005) "The role of personality traits in utaut model under online stocking," *Contemporary Management Research Policy*, 1, 1, 69-82.